Lecture 2

Biases and Heuristics

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PS4168: Economic Psychology

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Overview

- Biases
- Heuristics
- In-class Activity

Recap

In Pairs/groups

- Discuss “rationality”
- Define Homo-Economicus
- 2 approaches to studying decision making
- Differences between Economic Psychology and Behavioural Economics

Recap!

- Definition of Rationality?
  - Instrumental rationality
    - "our mental states or processes are rational when they help us to achieve our goals" (Over, 2004, p. 3)
- Two approaches to the study of decision making
  - Normative Theories *versus* Behavioural Theories
- Different traditions/methods

Biases

Biases

- "An inclination towards a position or conclusion" (Reber, 2001, p. 88)
- A tendency to:
  - act in a particular way
  - make judgements in a particular way
- An error in reasoning (Eysenck & Keane, 2005, p. 512)
- Todd & Gigerenzer (2012) introduce biases by analogy to optical illusions
  - "perceptual illusions are consequences of a perceptual system that is adapted to the structure of an uncertain world" (Todd & Gigerenzer, 2012, p. 80; see also Howe & Purves, 2005)
  - "it is essential to analyze the adaptive match between cognitive and ecological structures"(Todd & Gigerenzer, 2012, p. 80)

Cognitive illusions/Cognitive biases

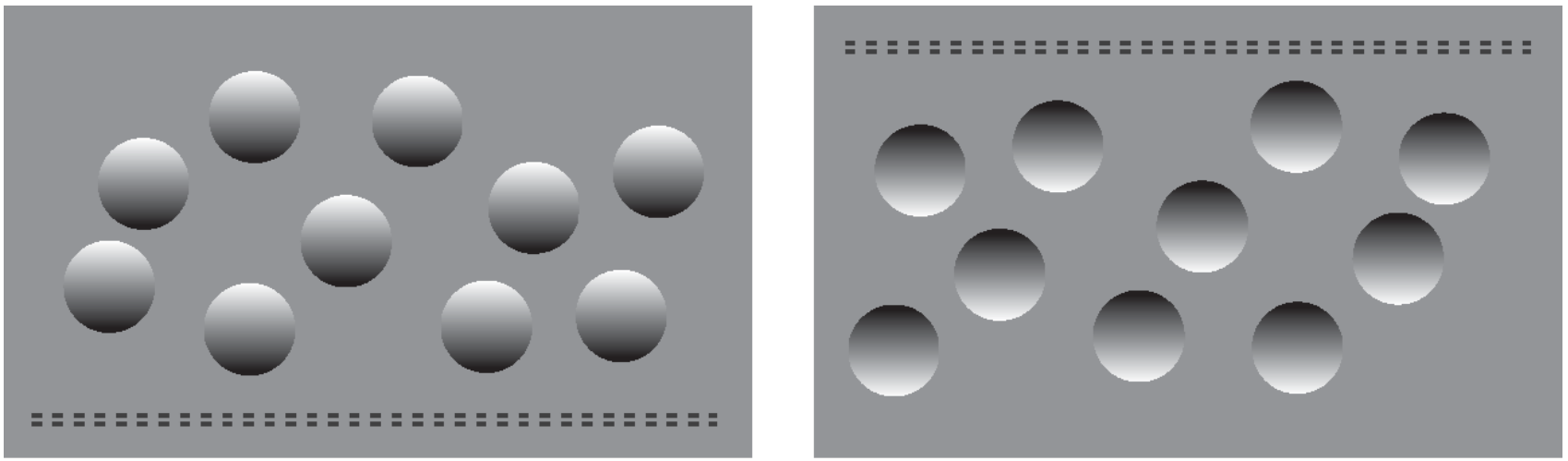

Figure 1: concave

Omission Bias

- Bias for inaction over action (e.g., Baron & Ritov, 2004)

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- Examples

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- Examples
  - Financial decisions

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- Examples
  - Financial decisions
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Omission Bias

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- Examples
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    - investments
    - pension funds
  - Medical decisions

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    - pension funds
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    - pension funds
  - Medical decisions
    - vaccinations
    - dietary medication

Omission Bias

- Bias for inaction over action (e.g., Baron & Ritov, 2004)
- Examples
  - Financial decisions
    - investments
    - pension funds
  - Medical decisions
    - vaccinations
    - dietary medication
- Linked to risk aversion?

The Halo Effect

- "The tendency to like (or dislike) everything about a person—including things you have not observed—is known as the halo effect"(Kahneman, 2011, p. 81)
- Political Leaders?
- Sports people?
- Artists/Actors?

The Halo Effect

https://www.youtube.com/embed/pWgyy_rImag" frameborder

Halo Effect - Moneyball

- “Good Face”
- “Good Jaw”
- “Can he Hit”?(Bennett, 2011)

Action Bias

- Bias for action over inaction (Bar-Eli, Azar, Ritov, Keidar-Levin, & Schein, 2007; e.g., Patt & Zeckhauser, 2000)
- Examples
  - Government policies
    - regulating markets
    - response to crises
  - Sport
    - Goal-keepers in soccer penalties
- (Links with Social Functionalist Theory?)

Wason's Rule Discovery Game

(Wason, 1960)

- I will provide a sequence of 3 numbers
- The sequence follows a simple rule
- You must identify the rule
  - You cannot ask for the rule
  - You must try guess the rule by providing your own sequence of numbers

2 - 4 - 6

Results

- Guesses attempt to confirm hypothesised rule rather than break the rule
  - e.g.,
  - hypothesised rule: "go up in 2s"
    - $8 - 10 - 12$
    - $10 - 12 - 14$
  - hypothesised rule: "add first two numbers to get third"
    - $3 - 7 - 10$
    - $4 - 9 - 13$
- What was the rule???

Confirmation bias

- People search for evidence to confirm their beliefs rather than to falsify them
  - Positive testing
  - Matching bias (Todd & Gigerenzer, 2012, p. 324)
- Examples?
  - All swans are white
  - "This always happens to me!"
  - Queues in a shopping centre

Syllogisms

- Deductive reasoning task:
  - a major premise, a minor premise, and a conclusion (Evans, 2003)
- No police dogs are vicious
- Some highly trained dogs are vicious
  - Therefore, some highly trained dogs are not police dogs
- valid / invalid

Syllogisms - Example 1

- No cigarettes are inexpensive.
- Some addictive things are inexpensive.
  - Therefore, some addictive things are not cigarettes.

Vote: https://app.sli.do/event/vZrcEo7RhhsSUSnemAjwoF/embed/polls/959fadbf-b78a-44a7-8976-7cf2f93922af

Syllogisms - Example 1

https://wall.sli.do/event/vZrcEo7RhhsSUSnemAjwoF?section=8c85a23a-eb31-4052-97ee-49a3c76e970c

Syllogisms - Example 2

- No addictive things are inexpensive.
- Some cigarettes are inexpensive.
  - Therefore, some addictive things are not cigarettes.

Vote: https://app.sli.do/event/vZrcEo7RhhsSUSnemAjwoF/embed/polls/959fadbf-b78a-44a7-8976-7cf2f93922af

Syllogisms - Example 2

https://wall.sli.do/event/vZrcEo7RhhsSUSnemAjwoF?section=8c85a23a-eb31-4052-97ee-49a3c76e970c

Syllogisms - Example 3

- No addictive things are inexpensive.
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Syllogisms - Example 3

https://wall.sli.do/event/vZrcEo7RhhsSUSnemAjwoF?section=8c85a23a-eb31-4052-97ee-49a3c76e970c

Syllogisms - Example 4

- No cigarettes are inexpensive.
- Some addictive things are inexpensive.
  - Therefore, some cigarettes are not addictive.

Vote: https://app.sli.do/event/vZrcEo7RhhsSUSnemAjwoF/embed/polls/959fadbf-b78a-44a7-8976-7cf2f93922af

Syllogisms - Example 4

https://wall.sli.do/event/vZrcEo7RhhsSUSnemAjwoF?section=8c85a23a-eb31-4052-97ee-49a3c76e970c

Belief Bias

S.	Believable	Unbelievable
Valid	No cigarettes are inexpensive. Some addictive things are inexpensive. Therefore, some addictive things are not cigarettes. **P("Valid") = 92%**	No addictive things are inexpensive. Some cigarettes are inexpensive. Therefore, some cigarettes are not addictive. **P("Valid") = 46%**
Invalid	No addictive things are inexpensive. Some cigarettes are inexpensive. Therefore, some addictive things are not cigarettes. **P("Valid") = 92%**	No cigarettes are inexpensive. Some addictive things are inexpensive. Therefore, some cigarettes are not addictive. **P("Valid") = 8%**

Other Biases

Hindsight bias

- The "I knew it all along" effect
- "The tendency to revise the history of one's beliefs in light of what actually happened"(Kahneman, 2011, p. 198)

Outcome bias

- The "You should have known" effect
- We **blame** decision makers for *good decisions that worked out badly*
  - and give them **too little credit** for *successful* decisions that appear obvious only after the fact
- Particularly unkind to decision makers who act as agents for others
  - physicians
  - financial advisers / CEOs
  - social workers
  - diplomats
  - politicians(Kahneman, 2011, p. 198)

General Knowledge

- Which city has more inhabitants?
  - Hyderabad
  - Islamabad

Vote: https://app.sli.do/event/2HpLUzYw48QzsHH3KWQgn7/embed/polls/adad10e1-e61e-4dce-a593-96b7e700c82e

Confidence

- How confident are you that your answer is correct?
  - 50% 60% 70% 80% 90% 100%

Vote: https://app.sli.do/event/sev81wpU1emixECBnf8Fhp/embed/polls/b98f813c-8406-4074-af03-02a5db179da0

General Knowledge

https://wall.sli.do/event/2HpLUzYw48QzsHH3KWQgn7?section=05f53be4-c1af-4408-a058-142bc49c3280

Confidence

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Overconfidence bias

- Hyderabad
  - 1,734,309
- Islamabad
  - 1,009,832
- The "systematic discrepancy between confidence judgments and the proportion of correct answers"(Todd & Gigerenzer, 2012, p. 93)

Biases Summary

Covered today:
omission bias
halo effect
action bias
confirmation bias
belief bias
hindsight bias
confidence bias
outcome bias

Other biases:
optimistic bias
planning fallacy

Some Critiques of Biases

- Dube et al. (2010) claim that belief bias is just a response bias
- Omission bias vs Action bias?
  - bias to conform?
  - bias to adhere to norms?
- Any other critiques?

Activity (link)

Heuristics

Heuristics

- "The term *heuristic* is of Greek origin, meaning *serving to find out or discover.*(Gigerenzer & Todd, 1999, p. 25)
- In 1905, Einstein published *On a heuristic point of view concerning the generation and transformation of light.*
  - (Nobel prize winning paper)
  - Einstein used the term *heuristic* to indicate that he considered the view he presented as
    - incomplete
    - false even
    - but still useful(Gigerenzer & Todd, 1999, p. 25)

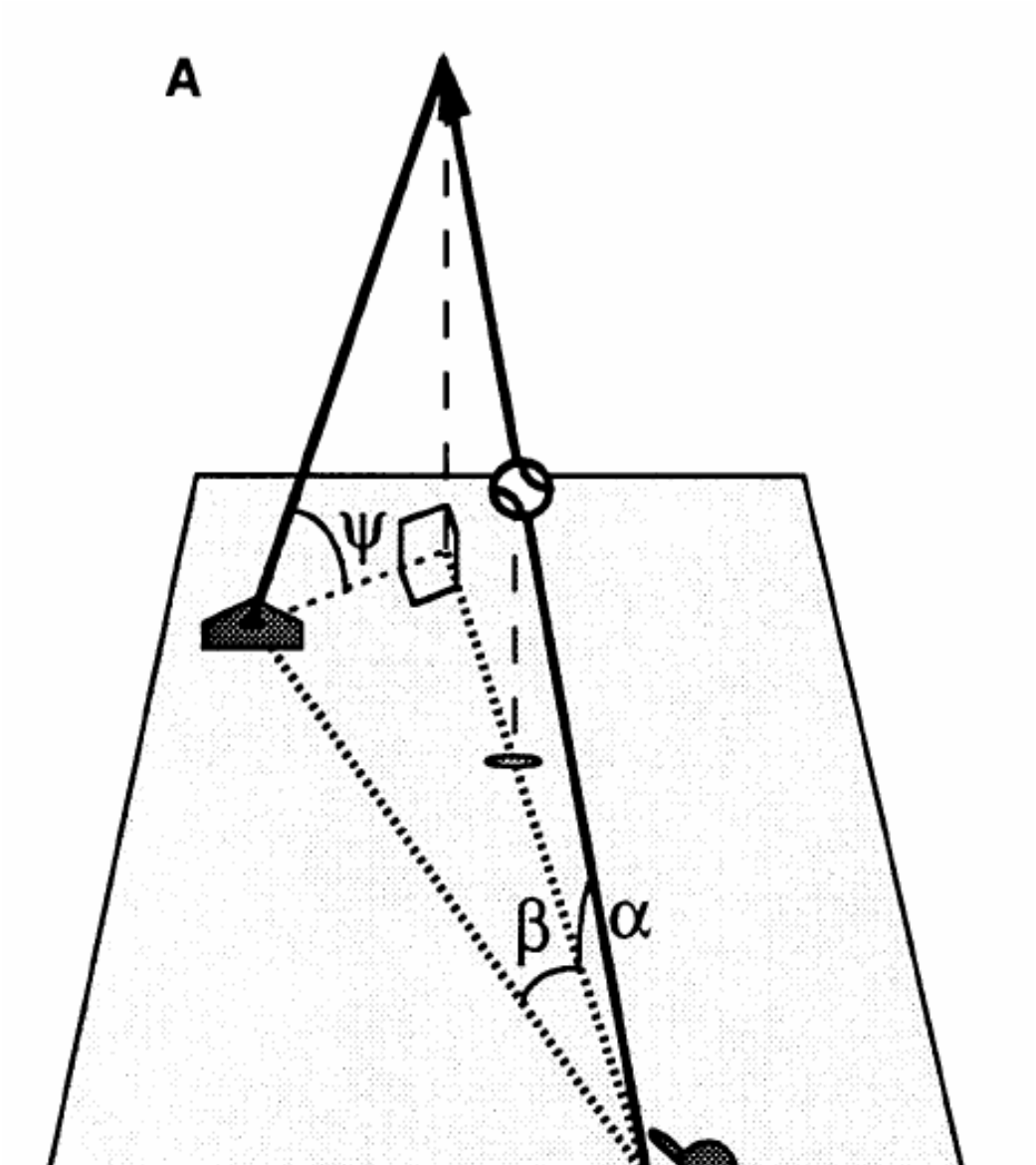
Heuristics

- In modern psychology, the term Heuristic has come to mean a
  - **mental shortcut** or **a rule of thumb** for decision making,
  - to help people make a quick, **satisfactory**
  - **but perhaps not perfect** answer to a complex question
- "A heuristic is any *rule of thumb* or simple rule of behavior by which a person solves a problem" (Cartwright, 2014, p. 33)
  - e.g., the shopper can solve their problem of what cereal to buy with the heuristic, 'buy what I usually do'(Cartwright, 2014, p. 33)
- Domain specific (Gigerenzer & Selten, 2002, pp. 7, 41)

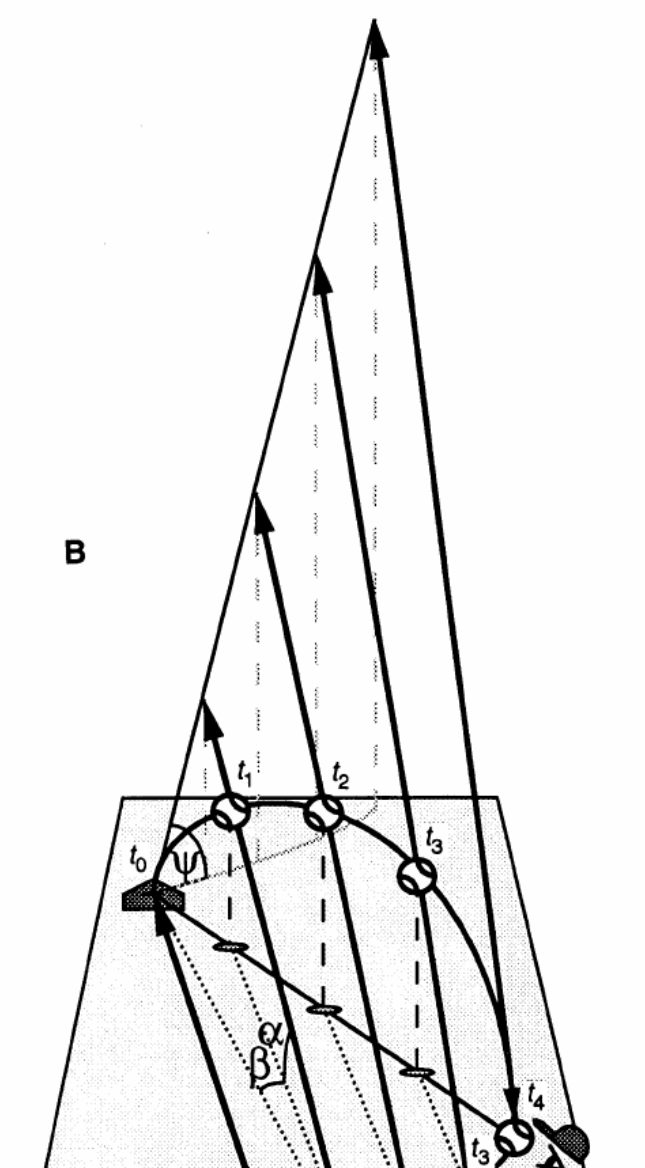
Catching a ball

- How does an outfielder catch a ball?
  - H1: Computing the balls trajectory?
  - H2: Gaze Heuristic
- H1: Trajectory computation predicts that players first estimate the point where the ball will come down, then run as fast as they can to this point and wait for the ball. (Todd & Gigerenzer, 2012, p. 28)
- H2: Gaze Heuristic predicts that players fix their gaze on the ball, start running, and adjust running speed so that the angle of gaze remains constant.
  - predicts changes in speed
  - predicts slight arc in certain situations

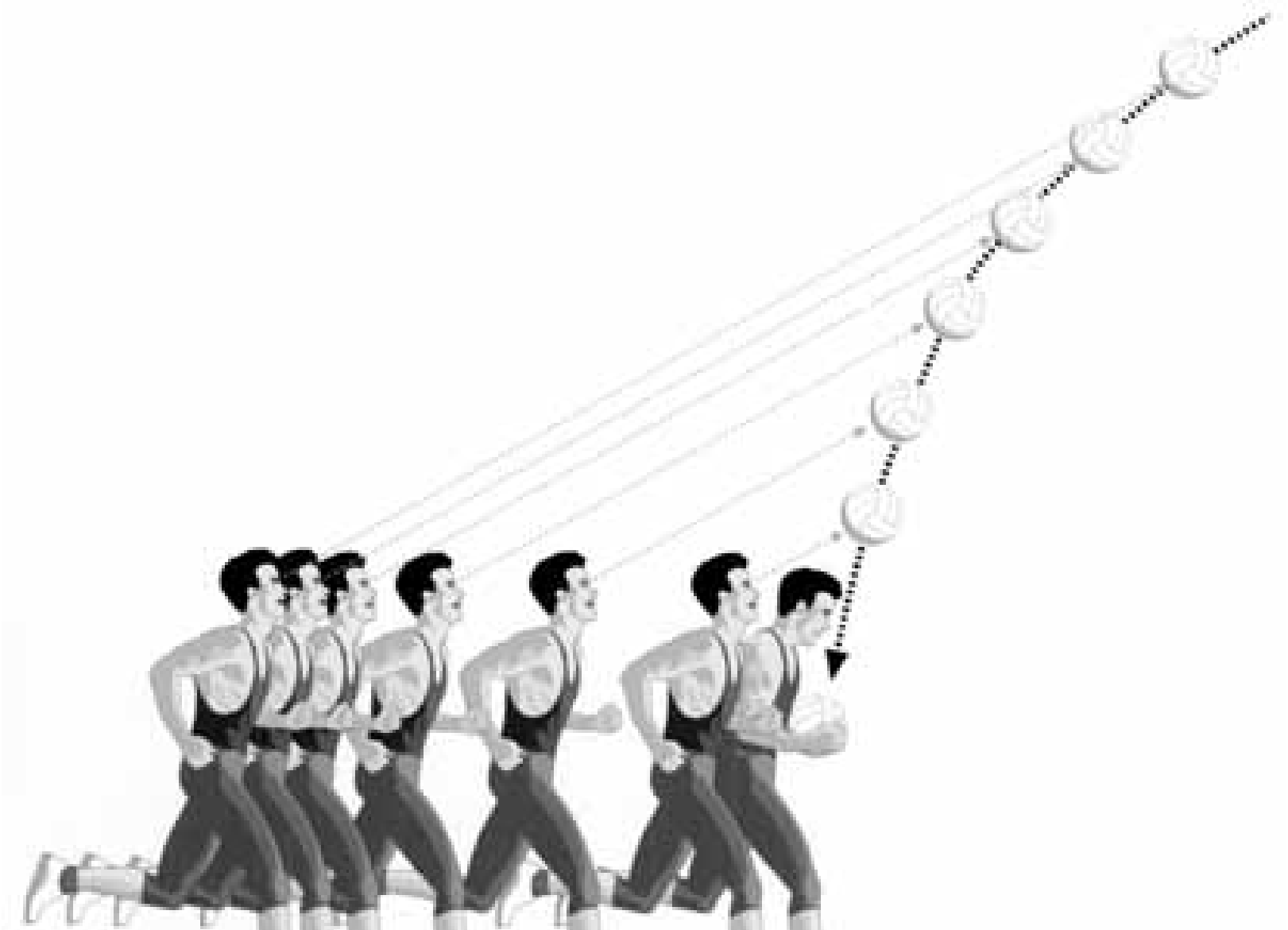
Computing the Trajectory



Gaze Heuristic



Catching a ball



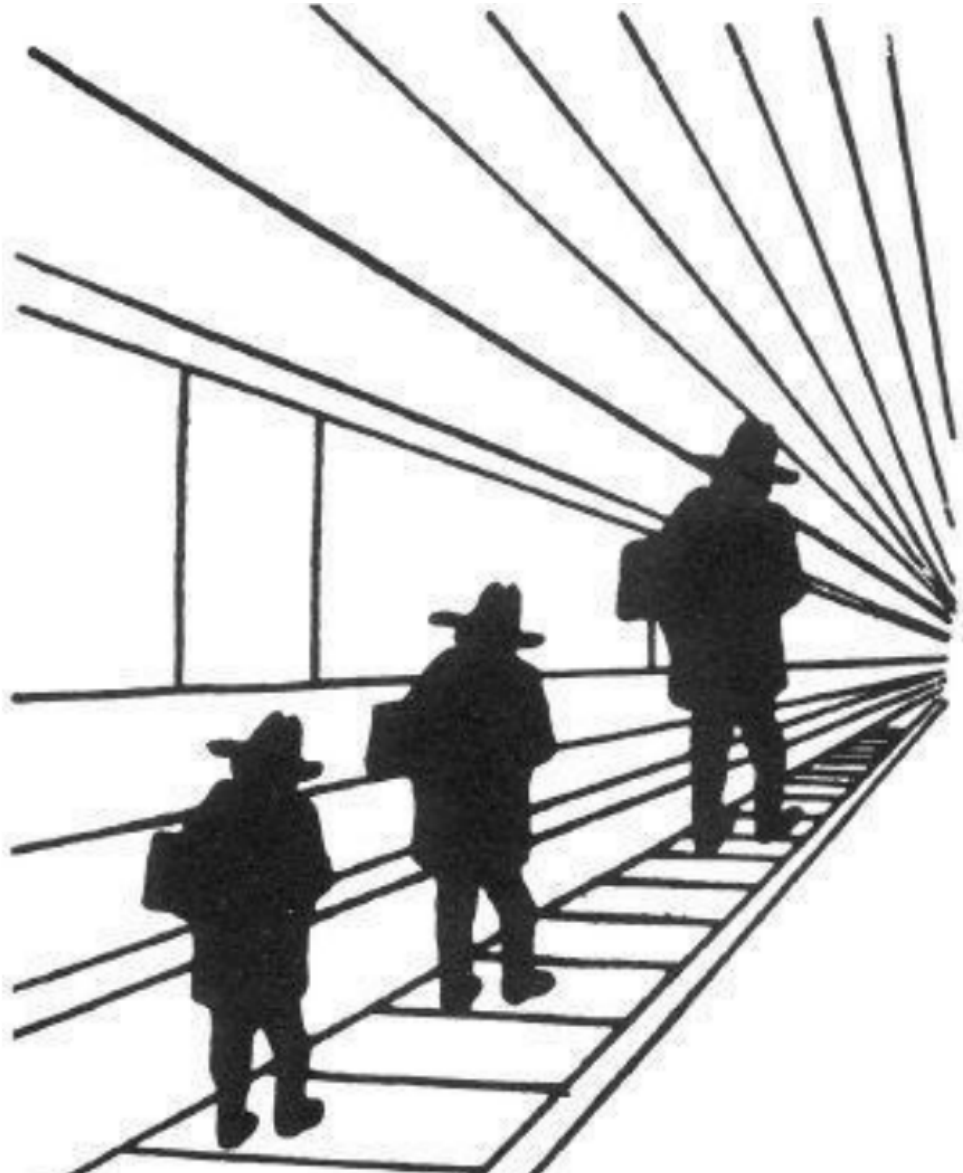
Gaze Heuristic

https://www.youtube.com/embed/-J1qryj6kdg

Catching a ball

- H2: Gaze Heuristic predicts that players fix their gaze on the ball, start running, and adjust running speed so that the angle of gaze remains constant.
- predicts changes in speed
- predicts slight arc in certain situations
  - **All Observed**

3D Heuristic



More General Heuristics

Word task

- Consider the letter K.
- Is K more likely to appear as the first letter in a word OR as the third letter?

Word task

- Consider the letter L.
- Is L more likely to appear as the first letter in a word OR as the third letter?

Word task

- Also true for the letters N, R, V
- How did you do it?
- It is easier to come up with words using the first letter than the third letter
- More **available** examples

The Availability Heuristic

- the process of judging frequency by "the ease with which instances come to mind"(Kahneman, 2011, p. 128)
- e.g., think of the number of words that can be constructed from the two sets of letters below.
  - XUZONLCJM
  - TAPCERHOB

The Availability Heuristic

- Inflated Salience
  - e.g., high media coverage of:
    - Divorces among Hollywood celebrities
    - Sex scandals among politicians
  - people exaggerate the frequency of both
- Dramatic events
  - A plane crash that attracts media coverage will temporarily alter your feelings about the safety of flying
  - after you see a car burning at the side of the road, accidents are on your mind and the world is for a while a more dangerous place.

The Availability Heuristic

- Personal experiences, pictures, vivid examples
  - **more available** than incidents that happen to others, mere words, or statistics
  - e.g., a judicial error that affects you will undermine your faith in the justice system more than a similar incident that you read about(Kahneman, 2011, p. 129)

Practical Examples

- Ross & Sicoly (1979) housework study
- First, list six instances in which you behaved assertively
  - Evaluate how assertive you are
- Now list 12 instances in which you behaved assertively
  - Evaluate how assertive you are(Schwarz, Bless, Strack, Klumpp, & et al, 1991)

Practical Examples (continued)

- It has been found that people:
  - believe that they use their bicycles less often after recalling many rather than few instances
  - are less confident in a choice when they are asked to produce more arguments to support it
  - are less confident that an event was avoidable after listing more ways it could have been avoided
  - are less impressed by a car after listing many of its advantages(Kahneman, 2011)

Heuristics and Errors

- A psychologist wrote thumbnail descriptions of a sample of 1000 participants consisting of 995 females and 5 males. The description below was chosen at random from the 1,000 available descriptions.
- Jo is 23 years old and is finishing a degree in engineering. On Friday nights, Jo likes to go out cruising with friends while listening to loud music and drinking beer.
- Which one of the following two statements is most likely?
  - Jo is a man
  - Jo is a woman

Representativeness Heuristic

- judging a situation based on how similar the prospects are to the prototypes the person holds in his or her mind.

Representativeness Heuristic

- Linda is thirty-one years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in antinuclear demonstrations.
- Which alternative is more probable?
  - Linda is a bank teller.
  - Linda is a bank teller and is active in the feminist movement.
- Conjunction fallacy
  - (and belief bias?)

Anchoring

- Taking information salient in the environment and using it to *anchor* your decisions
- e.g., rigged wheel of fortune: 10 or 65
  - Is the percentage of African nations among UN members larger or smaller than the number you just wrote?
  - What is your best guess of the percentage of African nations in the UN?
- Mean response 25% and 45% (depending on 10 or 65)

Mood Heuristic

- How happy are you these days?
- How many dates did you have last month?
- correlation?

Mood Heuristic

- How many dates did you have last month?
- How happy are you these days?

The Affect Heuristic

- "people let their likes and dislikes determine their beliefs about the world"(Kahneman, 2011, p. 102)
- Substitution
  - How do I feel about it?
- serves as an answer to a much harder question
  - What do I think about it? (Kahneman, 2011; Slovic, Peters, Finucane, & MacGregor, 2005)

Other Heuristics

Heuristic	Definition	Ecologically rational if:	Surprising findings (examples)
Recognition heuristic (Goldstein & Gigerenzer, 2002; chapter 5)	If one of two alternatives is recognized, infer that it has the higher value on the criterion.	Recognition validity > .5	Less-is-more effect if $\alpha > \beta$; systematic forgetting can be beneficial (chapter 6)
Fluency heuristic (Schooler & Hertwig, 2005; chapter 6)	If both alternatives are recognized but one is recognized faster, infer that it has the higher value on the criterion.	Fluency validity > .5	Less-is-more effect; systematic forgetting can be beneficial
Take-the-best (Gigerenzer & Goldstein, 1996; chapter 2)	To infer which of two alternatives has the higher value: (a) search through cues in order of validity; (b) stop search as soon as a cue discriminates; (c) choose the alternative this cue favors.	Cue validities vary, high redundancy	Often predicts more accurately than multiple regression (Czerlinski, Gigerenzer, & Goldstein, 1999), neural networks, exemplar models, and decision tree algorithms
Tallying (unit-weight linear model; Dawes, 1979)	To estimate a criterion, do not estimate weights but simply count the number of positive cues.	Cue validities vary little, low redundancy (Hogarth & Karelaia, 2005a, 2006b)	Often predicts as accurately as or better than multiple regression (Czerlinski et al., 1999)
Satisficing (Simon, 1955a; Todd & Miller, 1999; chapter 18)	Search through alternatives and choose the first one that exceeds your aspiration level.	Distributions of available options and other costs and benefits of search are unknown	Aspiration levels can lead to substantially better choice than chance, even if they are arbitrary (e.g., Bruss, 2000)
One-bounce rule (Hey, 1982)	Continue searching (e.g., for prices) as long as options improve; at the first downturn, stop search and take the previous best option.	Improvements come in streaks	Taking search costs into consideration in this rule does not improve performance

Figure 6: table

(taken from Todd & Gigerenzer, 2012, p. 9)

Other Heuristics

Heuristic	Definition	Ecologically rational if:	Surprising findings (examples)
Gaze heuristic (Gigerenzer, 2007; McBeath, Shaffer, & Kaiser, 1995)	To catch a ball, fix your gaze on it, start running, and adjust your running speed so that the angle of gaze remains constant.	The ball is coming down from overhead	Balls will be caught while running, possibly on a curved path
1/*N* rule (DeMiguel, Garlappi, & Uppal, 2009)	Allocate resources equally to each of *N* alternatives.	High unpredictability, small learning sample, large *N*	Can outperform optimal asset allocation portfolios
Default heuristic (Johnson & Goldstein, 2003; chapter 16)	If there is a default, follow it.	Values of those who set defaults match those of the decision maker; consequences of a choice are hard to foresee	Explains why advertising has little effect on organ donor registration; predicts behavior when trait and preference theories fail
Tit-for-tat (Axelrod, 1984)	Cooperate first and then imitate your partner's last behavior.	The other players also play tit-for-tat	Can lead to a higher payoff than "rational" strategies (e.g. by backward induction)
Imitate the majority (Boyd & Richerson, 2005)	Determine the behavior followed by the majority of people in your group and imitate it.	Environment is stable or only changes slowly; info search is costly or time consuming	A driving force in bonding, group identification, and moral behavior
Imitate the successful (Boyd & Richerson, 2005)	Determine the most successful person and imitate his or her behavior.	Individual learning is slow; info search is costly or time consuming	A driving force in cultural evolution

Figure 7: table

(taken from Todd & Gigerenzer, 2012, p. 10)

In-Class Activity

In-Class Activity

- In groups:
  - Identify possible *novel* heuristics

Possible Examples:

- Watching sport
  - Camera gaze heuristic
  - Waving flags heuristic
- Music
  - Chord-notes heuristic
- Copy others heuristic (novel situations/uncertainty)
- Empty seats on a bus/in class?
- Choosing a till in the supermarket?

Activity:(link)

https://docs.google.com/document/d/1ap7xShuXe9tIzDQOky54idFdKo3teKMHsJtClSxKUGg/edit?embedded=true&rm=minimal

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